PS-X45

AEP Model
US Model

STEREO TURNTABLE SYSTEM

SPECIFICATIONS

Turntable

Platter:	31 cm (12¼ in.), aluminum-alloy diecast
Motor:	Linear BSL (brushless and slotless) motor
Drive system:	Direct drive
Control system:	Crystal lock control, magnedisc servo control system
Speed:	$33^{1}/_{3}$ rpm, 45 rpm
Starting characteristics:	Comes to nominal speed within a half revolution ($33^{1}/_{3}$ rpm)
Wow and flutter:	0.02% (WRMS)*, 0.025% (WRMS) ±0.04% (DIN)
Signal-to-noise ratio:	78 dB (DIN-B)
Load characteristics:	0% up to 100 g stylus force (at lead-in groove of a record)
Speed deviation:	Within ±0.003%
Automatic system:	Lead-in, return, reject, repeat,

* This new measuring method concerns only the turntable assembly, including the platter. It excludes wow and flutter caused by the tonearm, the cartridge, or the record. Measured by obtaining signal from magnetic pick-up head.

Tonearm

Type:	Statically balanced
Pivot-to-stylus length:	216.5 mm (8½ in.)
Overall arm length:	300 mm ($11^{7}/_{8}$ in.)
Overhang:	16.5 mm ($^{21}/_{32}$ in.)
Tracking error:	(+) 3° – (–) 1°
Stylus force adjustment range:	0 – 2.5 g
Cartridge shell weight:	5 g
Cartridge weight range:	(including supplied shell) 7.5 – 11.5 g 11 – 15 g (with extra weight)

– Continued on page 2 –

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY SHADING AND MARK ⚠ ON THE SCHEMATIC DIAGRAMS, EXPLODED VIEWS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

SONY®

SERVICE MANUAL

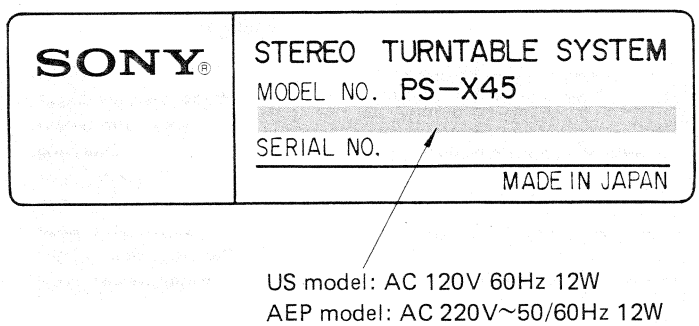
Cartridge

Type:	Moving-magnet
Frequency response:	10 – 30,000 Hz
Channel separation:	25 dB at 1 kHz
Output voltage:	3 mV at 1 kHz, 5 cm/sec, 45°
Load impedance:	50 kΩ – 100 kΩ
Tracking force:	1.0 – 2.0 g (1.5 g recommended)
Stylus:	Sony ND-200G Elliptical (0.3 x 0.8 mil), nude diamond
Weight:	3.5 g

General

Power requirements:	AEP model: 220 V ac, 50/60 Hz US model: 120 V ac, 60 Hz
Power consumption:	12 W
Dimensions:	Approx. 430 x 135 x 375 mm (w/h/d) (17 x 5 3/8 x 14¾ in.) including projecting parts and controls
Weight:	Approx. 7 kg (15 lbs 7 oz), net Approx. 8.6 kg (19 lbs), in shipping carton

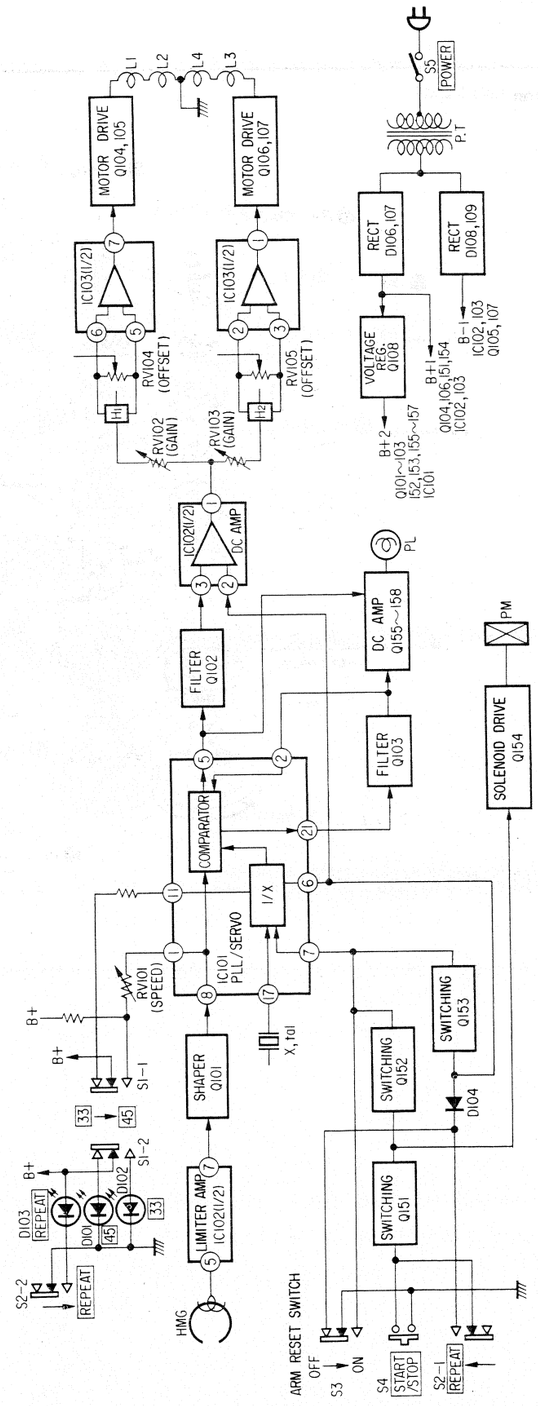
MODEL IDENTIFICATION
—Specification Label—



US model: AC 120V 60Hz 12W
AEP model: AC 220V~50/60Hz 12W

SECTION 1
OUTLINE

1-1. BLOCK DIAGRAM

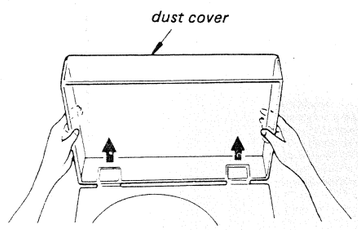


SECTION 2
DISASSEMBLY

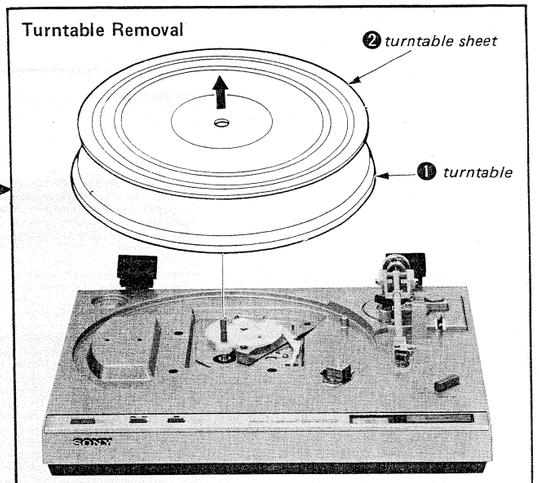
2-1. REMOVAL

Note: Follow the disassembly procedure in the numerical order given.

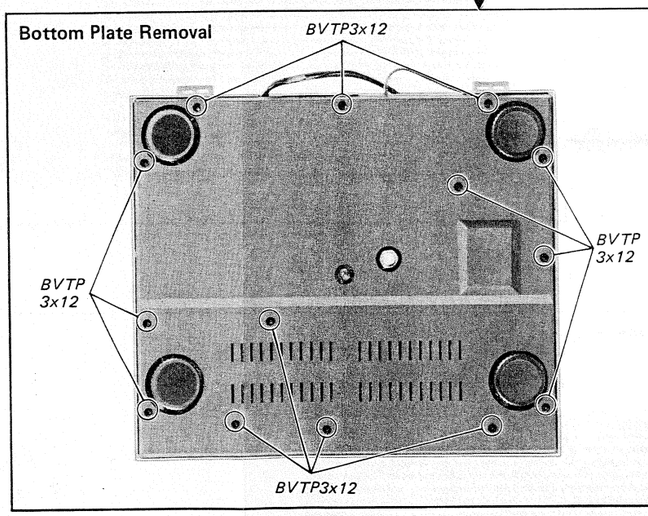
Dust Cover Removal



Turntable Removal

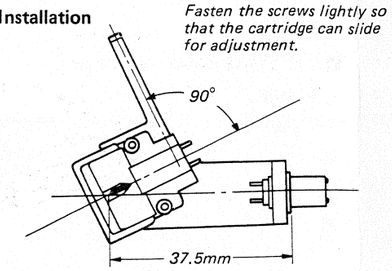


Bottom Plate Removal

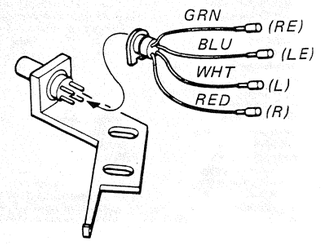


Cartridge Installation

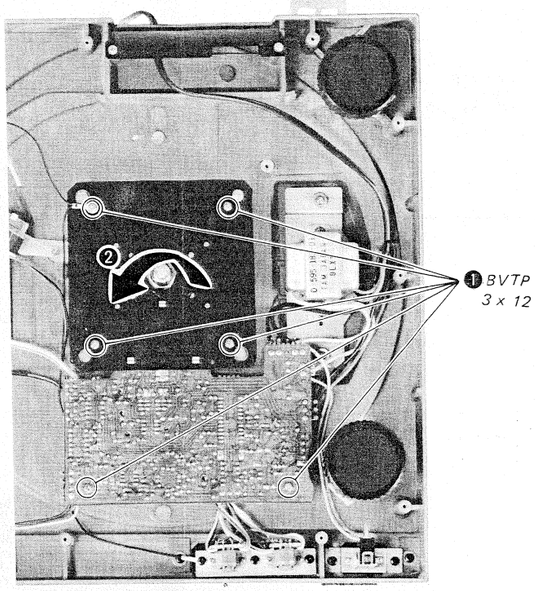
Fasten the screws lightly so that the cartridge can slide for adjustment.



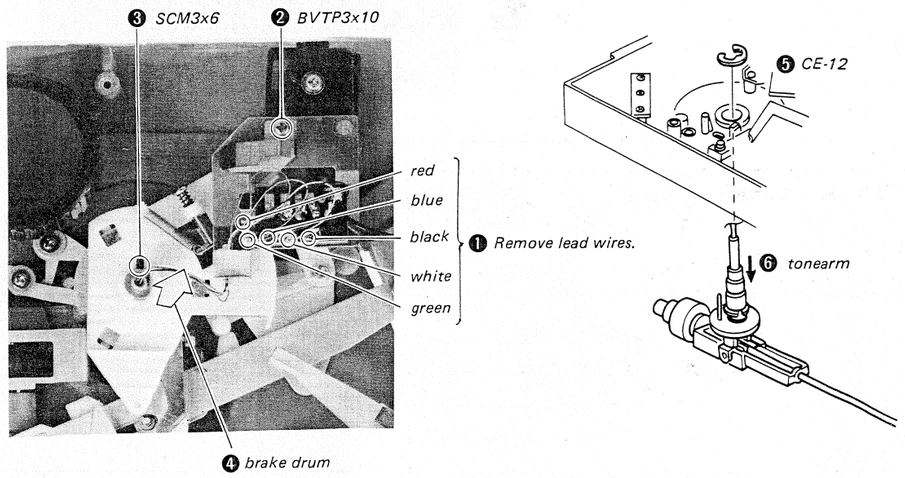
Lead Wire Connection



Motor Removal

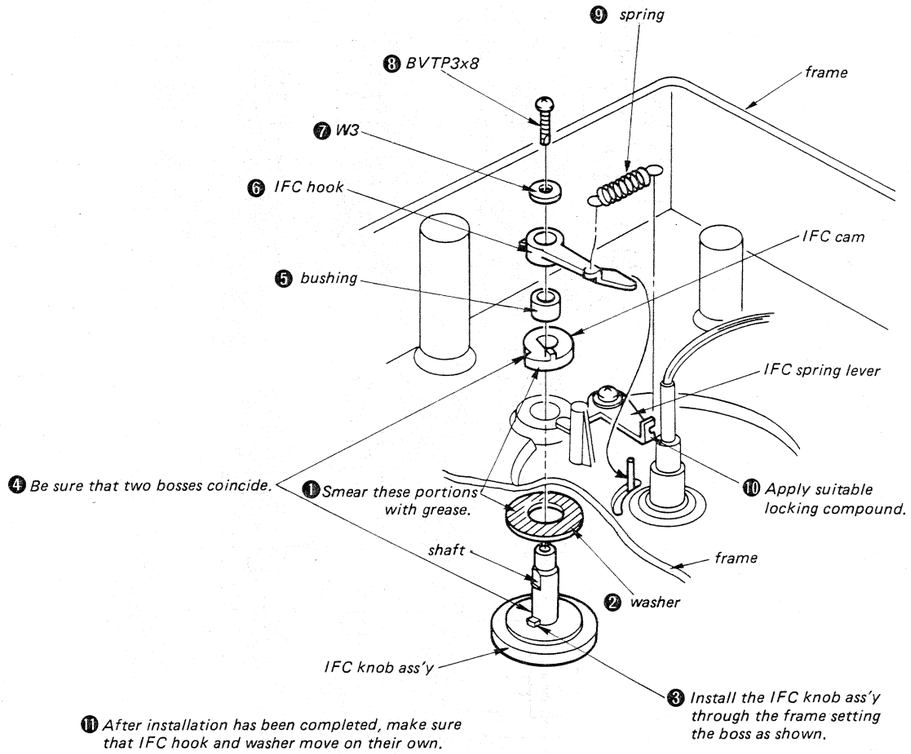


Tonearm Removal



2-2. INSTALLATION

IFC Knob Assembly Installation


❾ spring
❽ BVTP3x8
frame
❼ W3
❻ IFC hook
IFC cam
❺ bushing
IFC spring lever
❹ Be sure that two bosses coincide.
❶ Smear these portions with grease.
❿ Apply suitable locking compound.
shaft
frame
❷ washer
IFC knob ass'y
❸ Install the IFC knob ass'y through the frame setting the boss as shown.
⓫ After installation has been completed, make sure that IFC hook and washer move on their own.

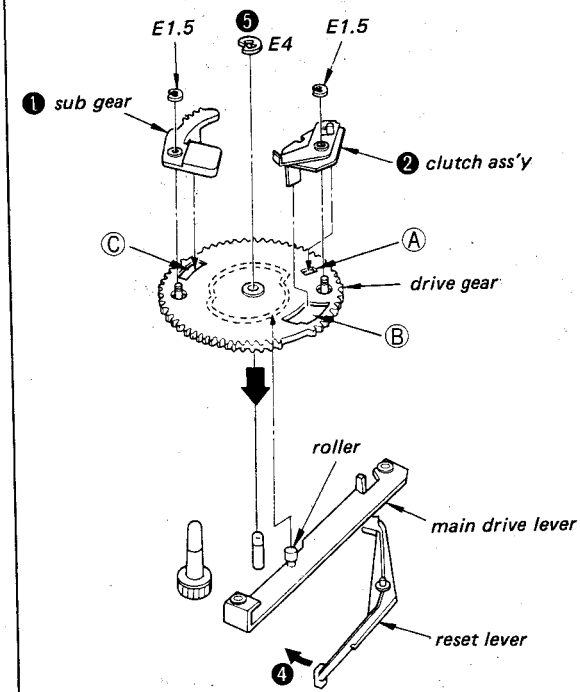
Drive Gear Installation

❶ Install the sub gear in hole Ⓒ with E1.5.

❷ Install the clutch ass'y in holes Ⓐ and Ⓑ with E1.5.

❸ After installation(❶ , ❷)has been completed, make sure they move on their own.

❹ Install the drive gear pushing the reset lever in the direction of arrow, when the roller of the main drive lever fits the gutter of the drive gear.

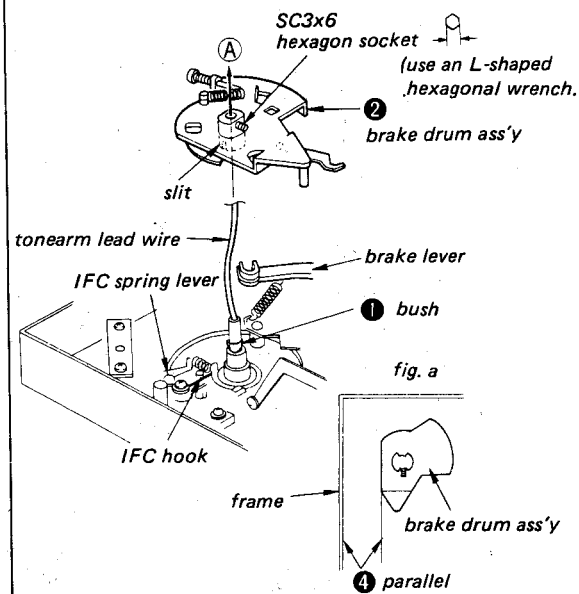


Brake Drum Installation

❷ Thread the brake drum ass'y with the tonearm lead wires. Pull the wires out in the direction of the arrow Ⓐ .

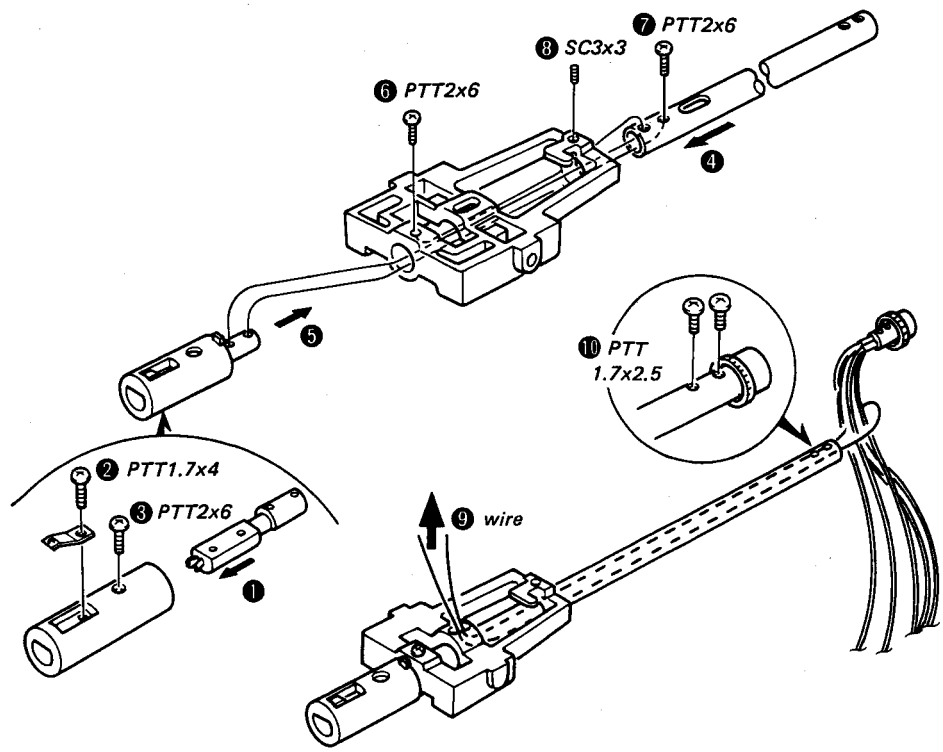
❸ Set the tonearm on the arm rest.

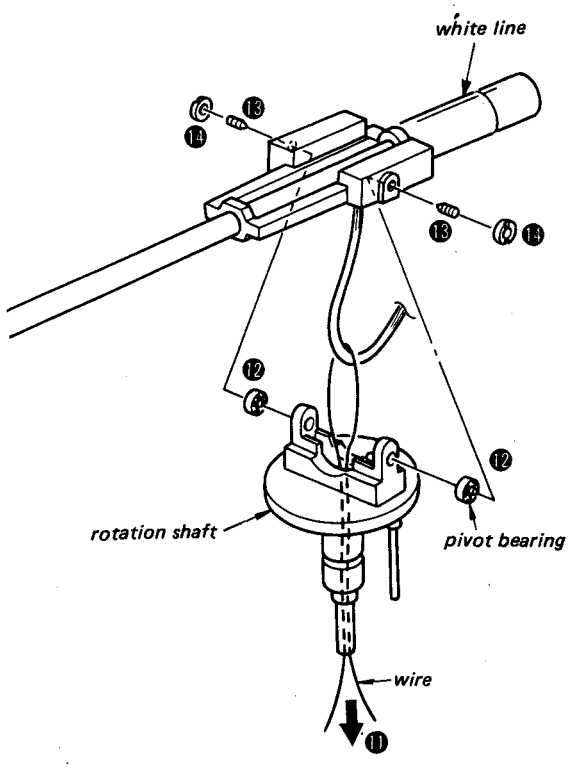
❹ Adjust the position of the brake drum to obtain the same height as the brake lever and also, so that the straight side of drum is parallel with the frame (See fig. a). Fix the drum by turning the set screw (SC3 x 6).

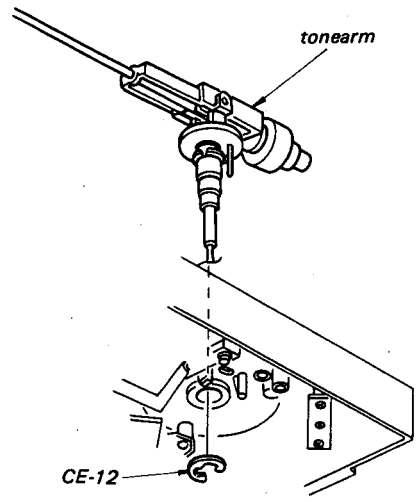


TONEARM INSTALLATION

Tonearm Pipe Installation



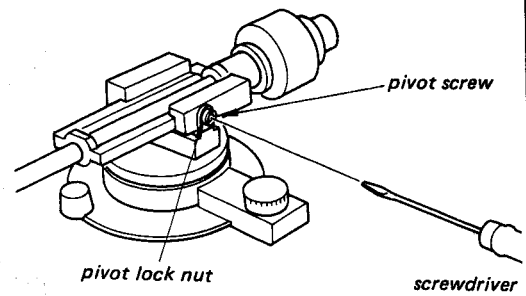


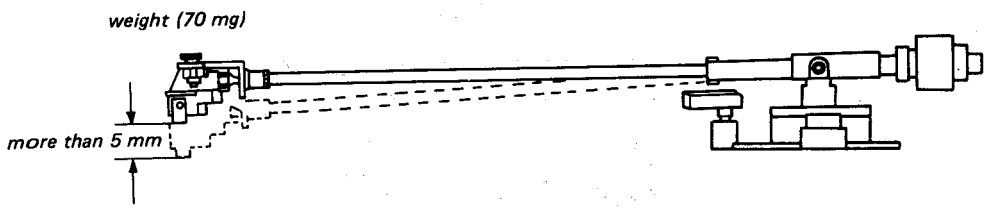


Longitudinal Sensitivity Adjustment

1. Make the longitudinal balance adjustment of tonearm.
2. Repeating the following procedures, adjust the pivot screw and the lock nut.
   a. When the 70 mg weight is placed on the top of the shell, the tonearm sinks more than 5 mm (measured at stylus-tip).
   b. When the weight is removed, the tonearm returns horizontally.

Note: Rotate the left and right pivot screws by same numbers of turns.





MOTOR INSTALLATION

The motor and the servo amp board are assembled together. If found defective, disassemble the motor block as shown in Fig. A and repair it.

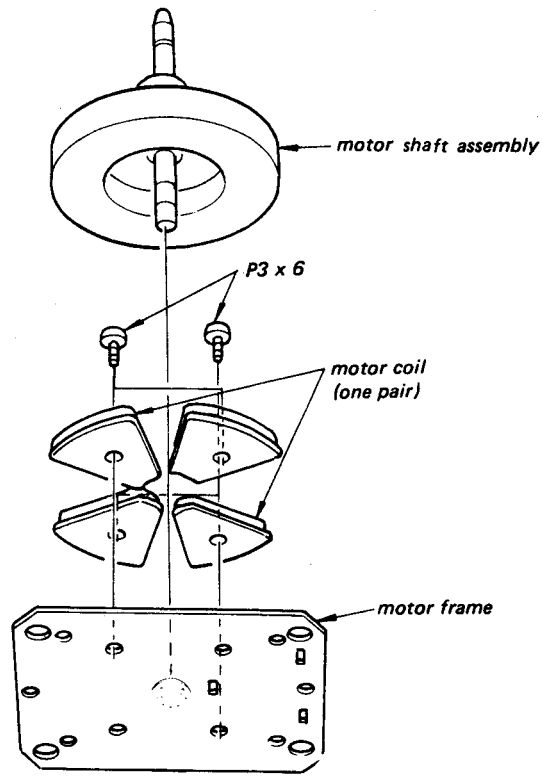


Fig. A

1. When the motor shaft is replaced, apply two drops of the SONY oil (OL-2KA) as shown below.

2. When the motor bearing and the thrust retainer plate are replaced, apply two drops of the SONY oil (OL-2KA) as shown below.

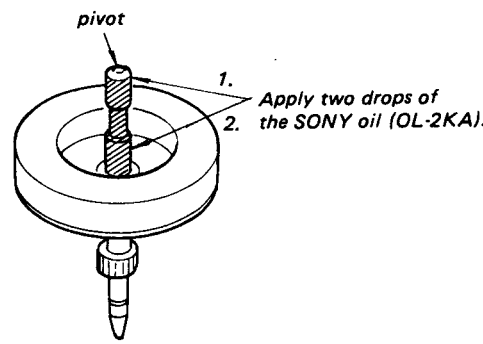


Fig. B

3. The motor coils are composed of two pairs.
   a). Mount the coils on the motor frame so that the boss of the coil is placed in the hole of the frame as illustrated in Fig. C.
   b). Push the coils in the direction of arrow and tighten the screws.
   c). Lay the leads of the coils as shown in Fig. D and fix the leads in the slot between the portions marked by *in Fig. E.
4. Insert the motor shaft assembly slowly in the motor bearing so that the motor shaft is not attracted by strong magnetic field strength.

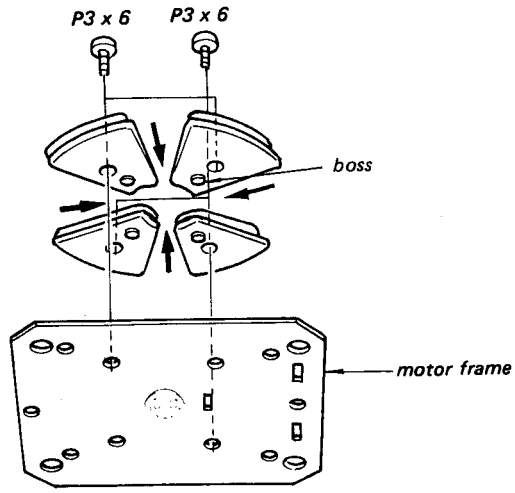


Fig. C

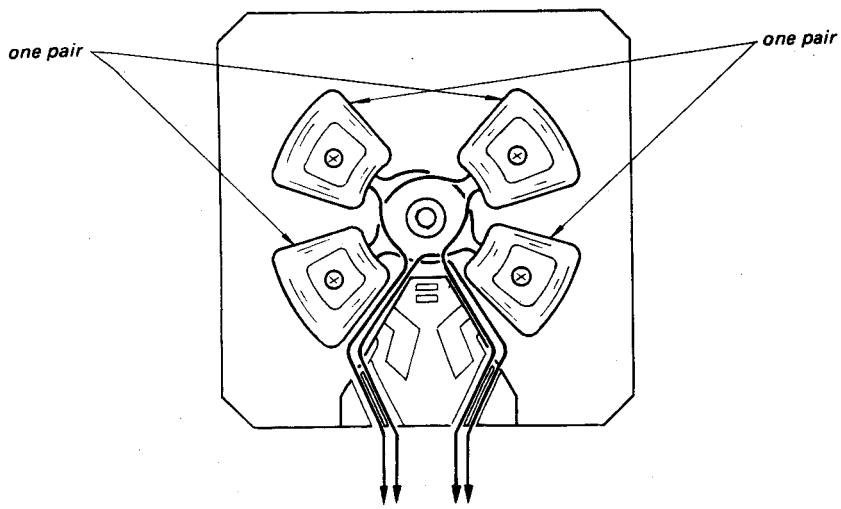


Fig. D

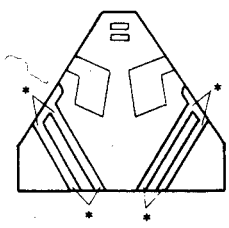


Fig. E

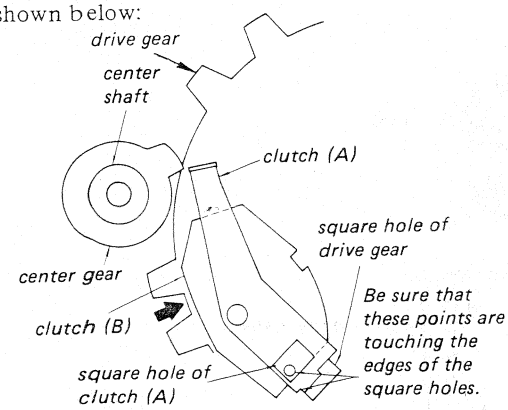
SECTION 3
ADJUSTMENTS

3-1 MECHANICAL ADJUSTMENTS

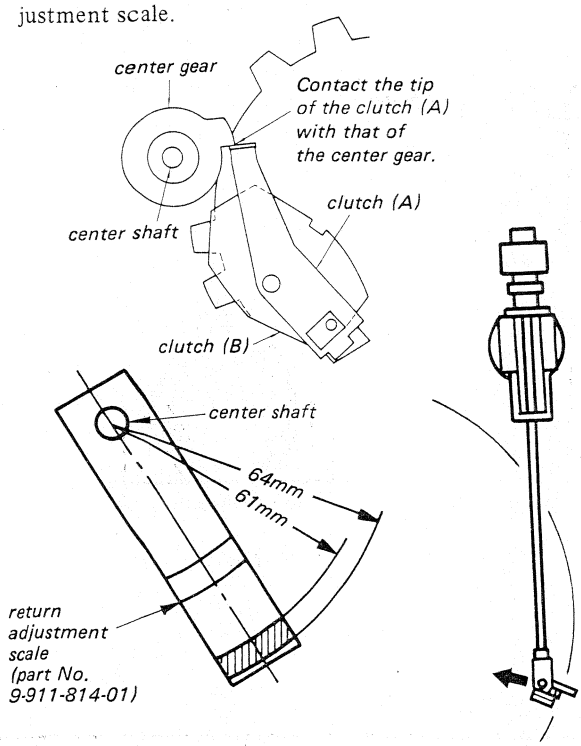
Automatic Return Position Adjustment

- Unplug the power cord.

1. Remove the turntable mat and turntable.
2. Put the tonearm on the arm rest.
3. Turn the center shaft clockwise by hand and turn the drive gear one turn by engaging the center gear with the drive gear. Then place the drive gear in the disengaging position.
4. Push the clutch (B) in the direction of the arrow and place the clutch (A) and cluth (B) as shown below:


drive gear
center shaft
clutch (A)
square hole of drive gear
center gear
clutch (B)
square hole of clutch (A)
Be sure that these points are touching the edges of the square holes.

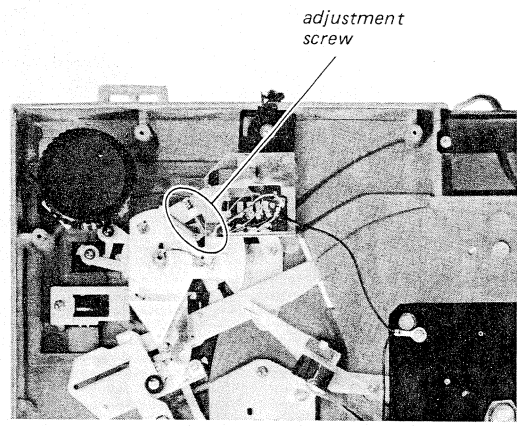
5. Put the return adjustment scale (Part No. 9-911-814-01) on the center shaft.
6. Move the tonearm toward the center shaft by hand so that the clutch (A) is positioned as shown below and confirm that the stylus is located on the hatched area of the return adjustment scale.

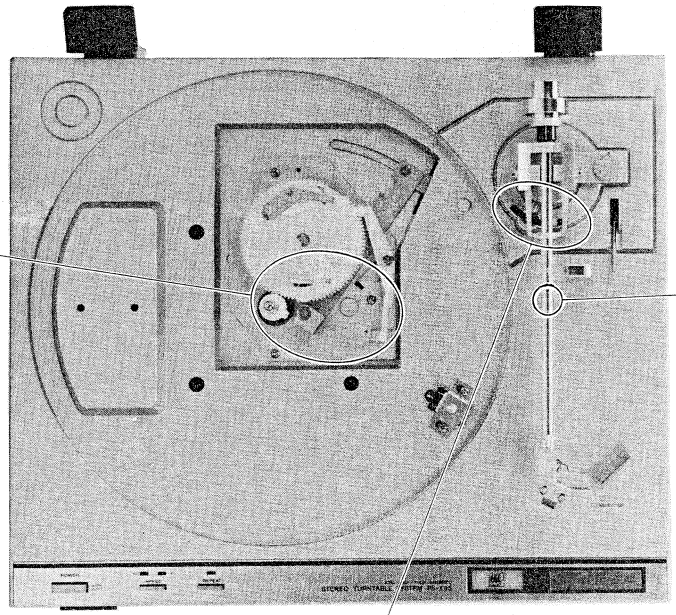


7. If necessary, adjust the adjustment screw.

Stylus Position	Adjustment Screw
outside of hatched area	clockwise
inside of hatched area	counterclockwise
on hatched area	correct

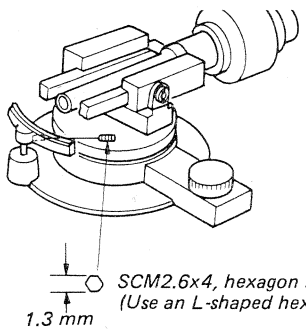
8. Play the automatic-return test record (YFSC-16, A side "C-3") and confirm that the tonearm returns at count 4 to 11.





Arm Lifter Height Adjustment

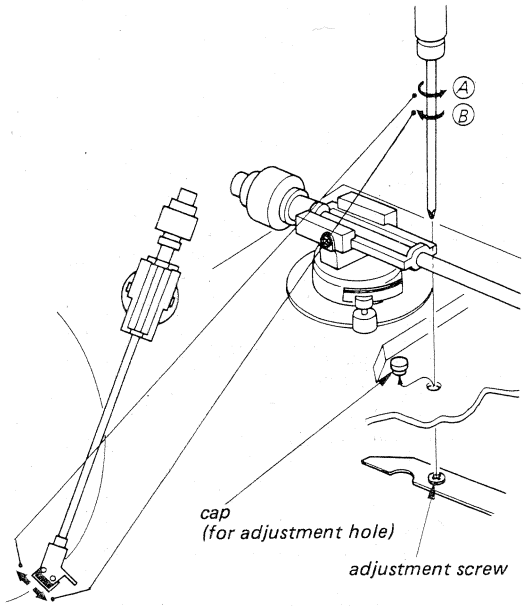
- Unplug the power cord.



The clearance between the stylus tip and the record on the rubber mat should be 7–11mm ($^5/_{16}$ – $^7/_{16}$").

Stylus Drop-point Adjustment

- Remove the cap from the adjustment hole.



1. Set the record size selector lever to the 30 (12") position and make sure that the stylus gets down on the specified point of the test record.

   test record: YFSC-16

Record size selector lever position	Count of drop-point
30 (12")	4 to 16
25 (10")	6 to 24
17 (7")	7 to 25

2. If necessary, insert the screwdriver into the hole and adjust the drop-point by turning the adjustment screw.

   To change the drop-point inward:
   Turn the adjustment screw slightly counterclockwise Ⓐ.

   To change the drop-point outward:
   Turn the adjustment screw slightly clockwise Ⓑ.

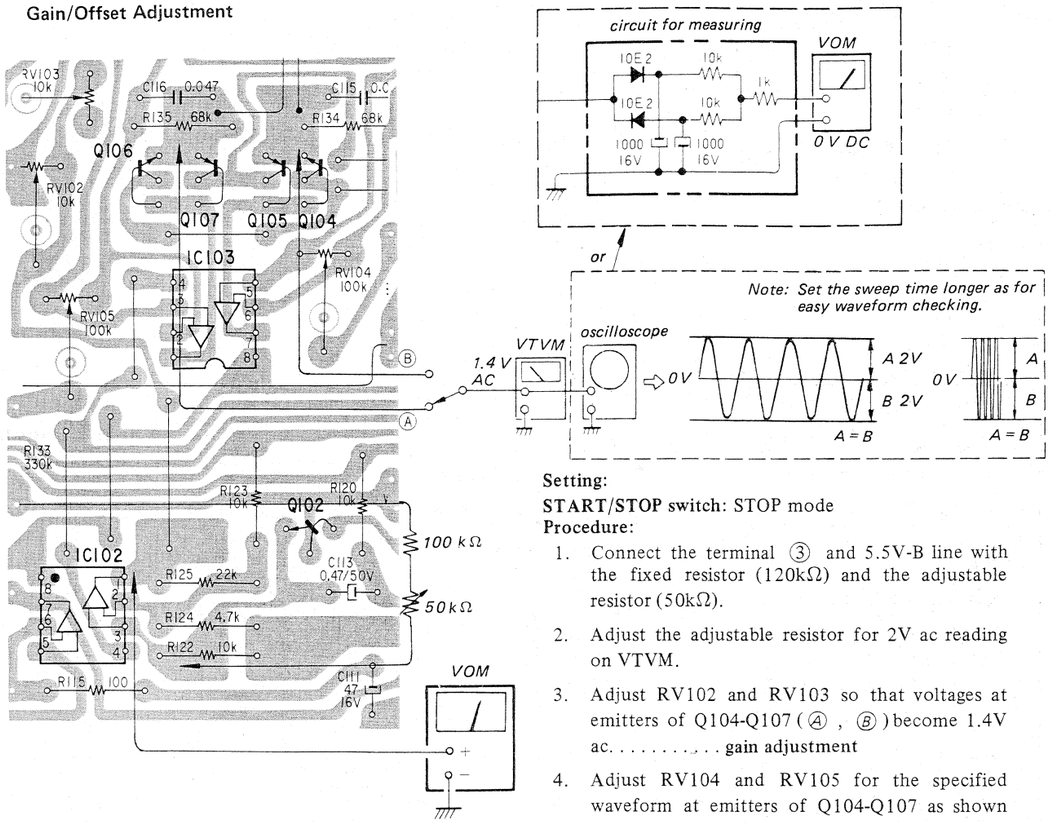
3. Once it is properly adjusted with a 30 cm (12") record, the drop-point will be correct for 17 cm (7") and 25 cm (10") records as well.

Note: The stylus drop-point is changed to about 12 mm (½") by one turn of the adjustment screw.

PS-X45

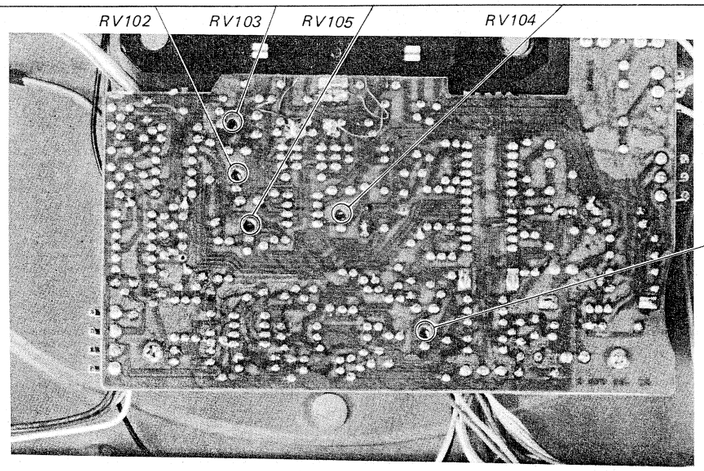
3-2. ELECTRICAL ADJUSTMENTS

Gain/Offset Adjustment



Setting:
START/STOP switch: STOP mode
Procedure:

1. Connect the terminal ③ and 5.5V-B line with the fixed resistor (120kΩ) and the adjustable resistor (50kΩ).
2. Adjust the adjustable resistor for 2V ac reading on VTVM.
3. Adjust RV102 and RV103 so that voltages at emitters of Q104-Q107 (Ⓐ , Ⓑ) become 1.4V ac. . . . . gain adjustment
4. Adjust RV104 and RV105 for the specified waveform at emitters of Q104-Q107 as shown above or for 0Vdc on the VTVM. . . . . offset adjustment



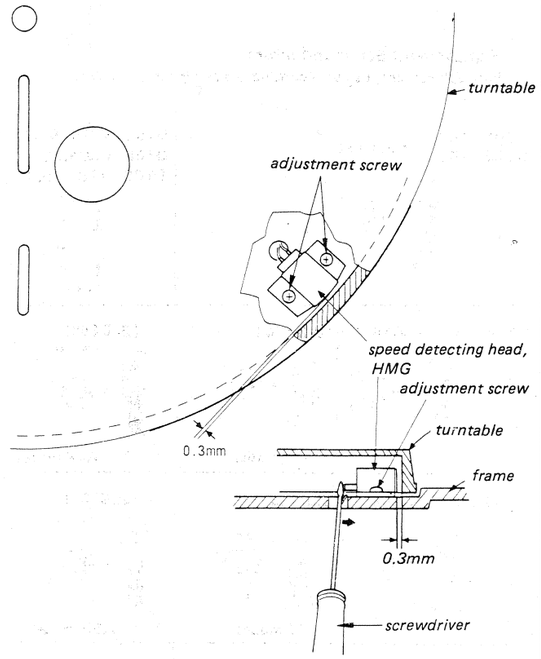
Speed-Detecting Head Output Adjustment

1. Adjust the position of the speed-detecting head by loosening the two screws (TA, B 3 x 10) as shown in the figure so that the VTVM reading is more than 20 mV ac at 33 rpm.
2. Make sure that the head does not touch the turntable and tighten the screws securely.

Note:

- Maladjustment results in wow-flutter.
- The clearance between the magnet-coated rim and the speed-detecting head is more than 0.3mm.

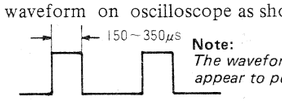
Reference:
Adjust the position of the speed-detecting head by inserting a card (approx. 0.3 mm thick) between the magnetic coating of the turntable and the speed-detecting head.



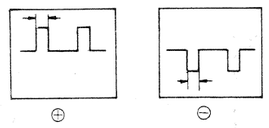
Speed Adjustment

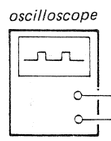
Setting:
SPEED Switch: 33

1. Adjust RV101 for the specified waveform on oscilloscope as shown below.

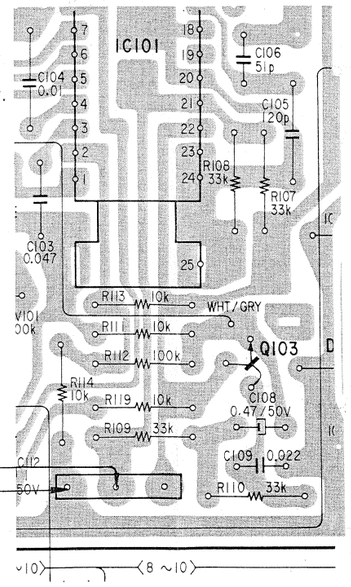


Note:
The waveform should appear to positive side.





RV101

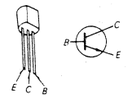


4-1. MOUNTING DIAGRAM

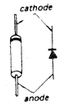
– Conductor Side –

- **Replacement Semiconductors**
  For replacement, use semiconductors except in ( ).

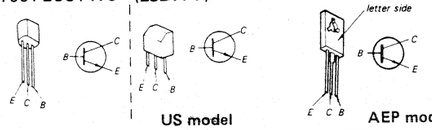
Q101~103, Q152~158 : 2SC1364



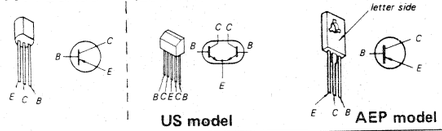
D104 : 1S1555 (1T40)
D105 : HZ9A2-L
D106~109 : 10E2



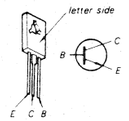
Q104, 106 : 2SC1475 (2SD774) (2SD809)



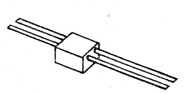
Q105, 107 : 2SA684 (2SB734) (2SB731)



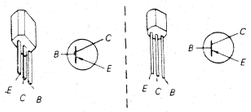
Q108 : 2SD414



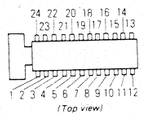
H1, 2 : HL300C



Q151 : 2SA1027R (2SA733)

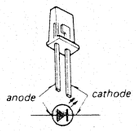


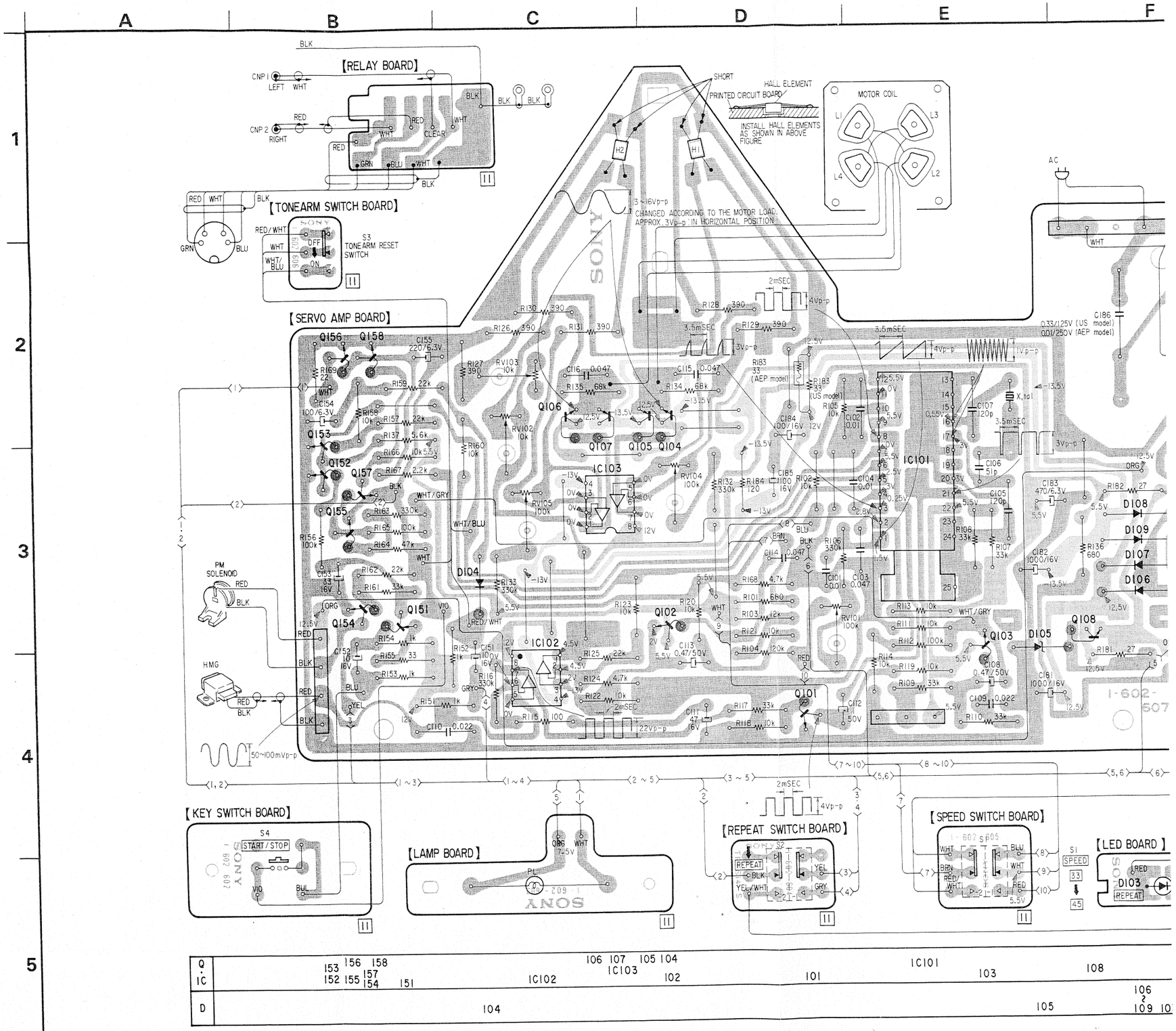
IC101 : CX193



IC102, 103 : μPC4558C (μPC4558)

D101~103 : SEL1120R





| | | |

B C D E F G H

【RELAY BOARD】

【TONEARM SWITCH BOARD】

S3 TONEARM RESET SWITCH

【SERVO AMP BOARD】

HALL ELEMENT
PRINTED CIRCUIT BOARD
INSTALL HALL ELEMENTS AS SHOWN IN ABOVE FIGURE
MOTOR COIL

3.16Vp-p CHANGED ACCORDING TO THE MOTOR LOAD. APPROX. 3Vp-p IN HORIZONTAL POSITION

AC
P.T
S5 POWER
0.33/125V (US model)
0.01/250V (AEP model)

IC101 CX-193
F.F
1/X
STROBO SCOPE
COMPARATOR
SAMPLE HOLD
B+
GND

【LAMP BOARD】

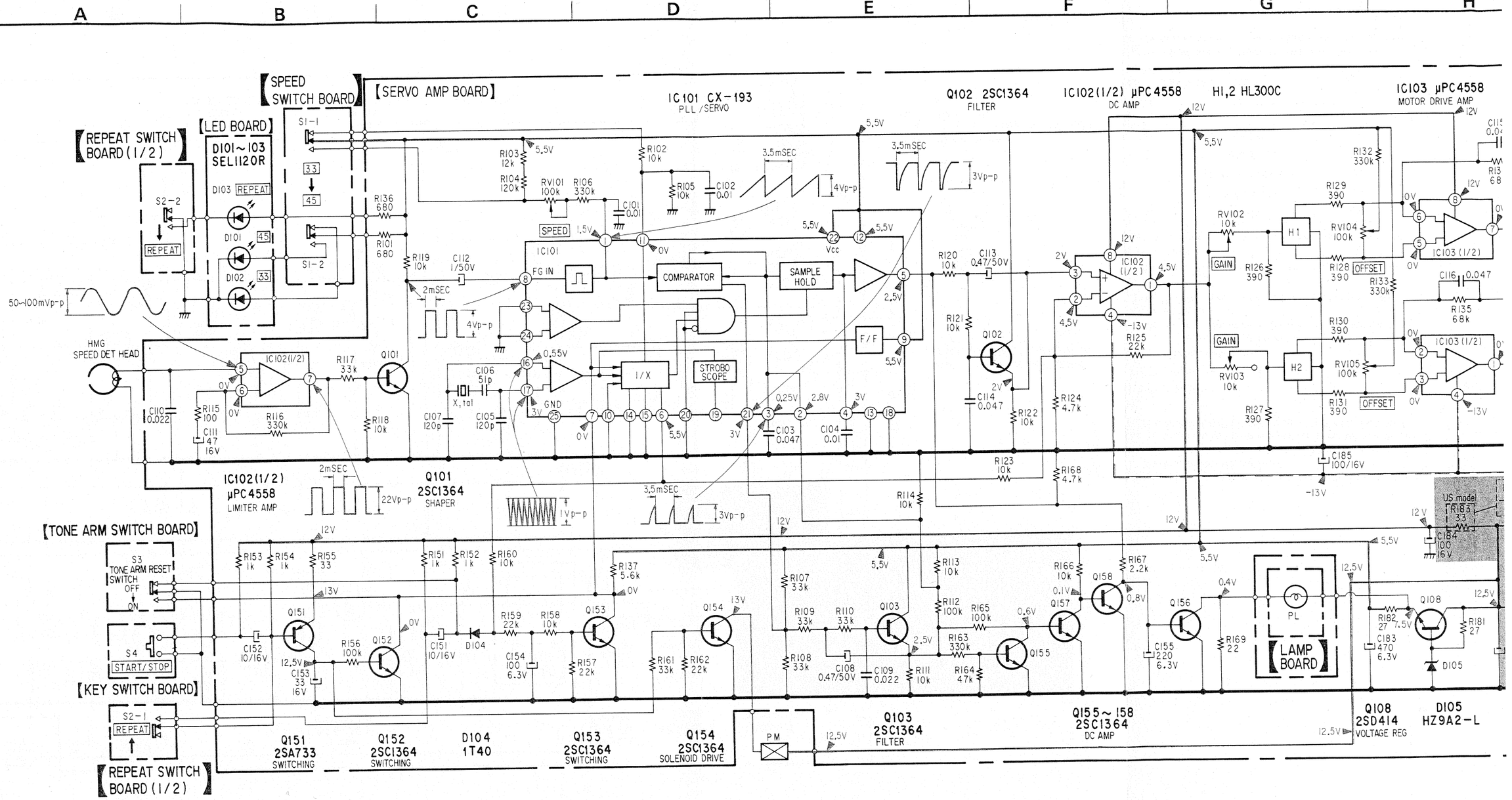
【REPEAT SWITCH BOARD】

【SPEED SWITCH BOARD】

【LED BOARD】
D103 REPEAT
D102 33
D101 45 SPEED

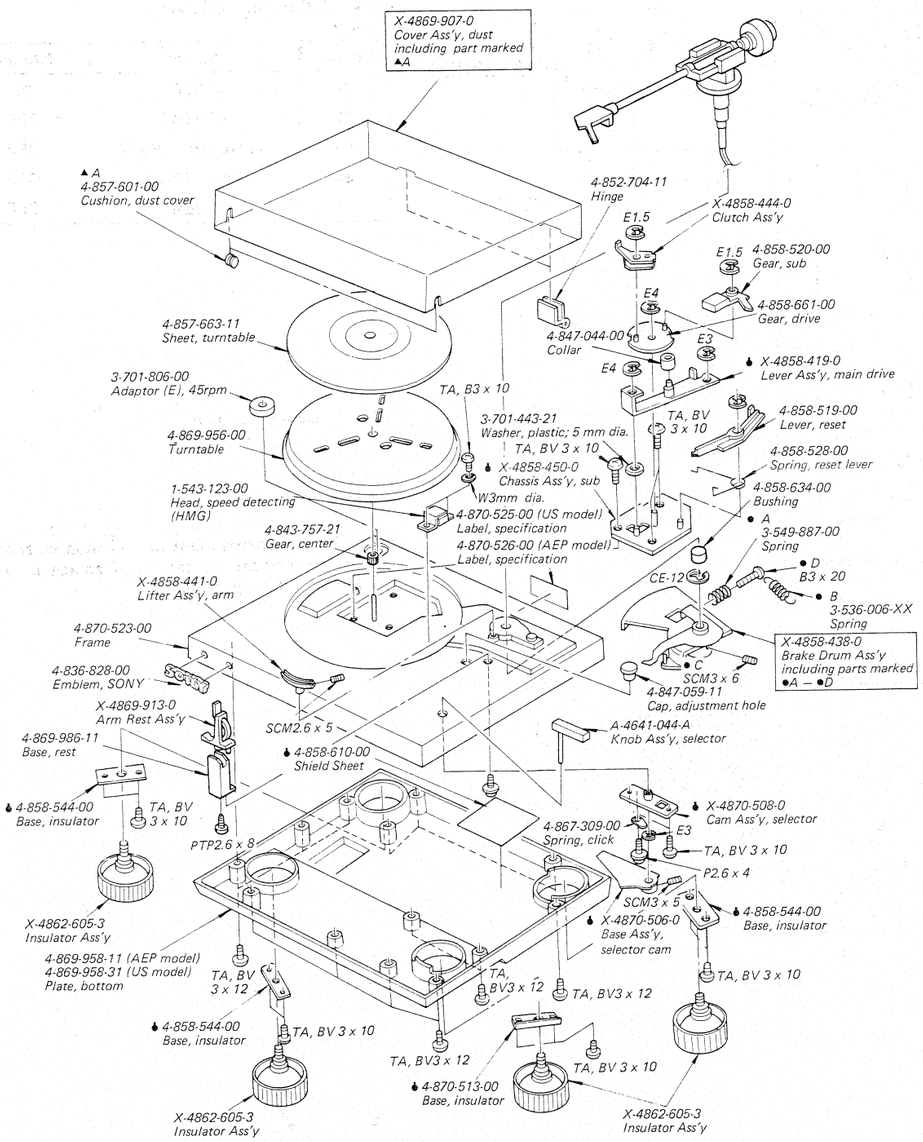
| | | |

4-2. SCHEMATIC DIAGRAM



SECTION 5
EXPLODED VIEWS

5-1.

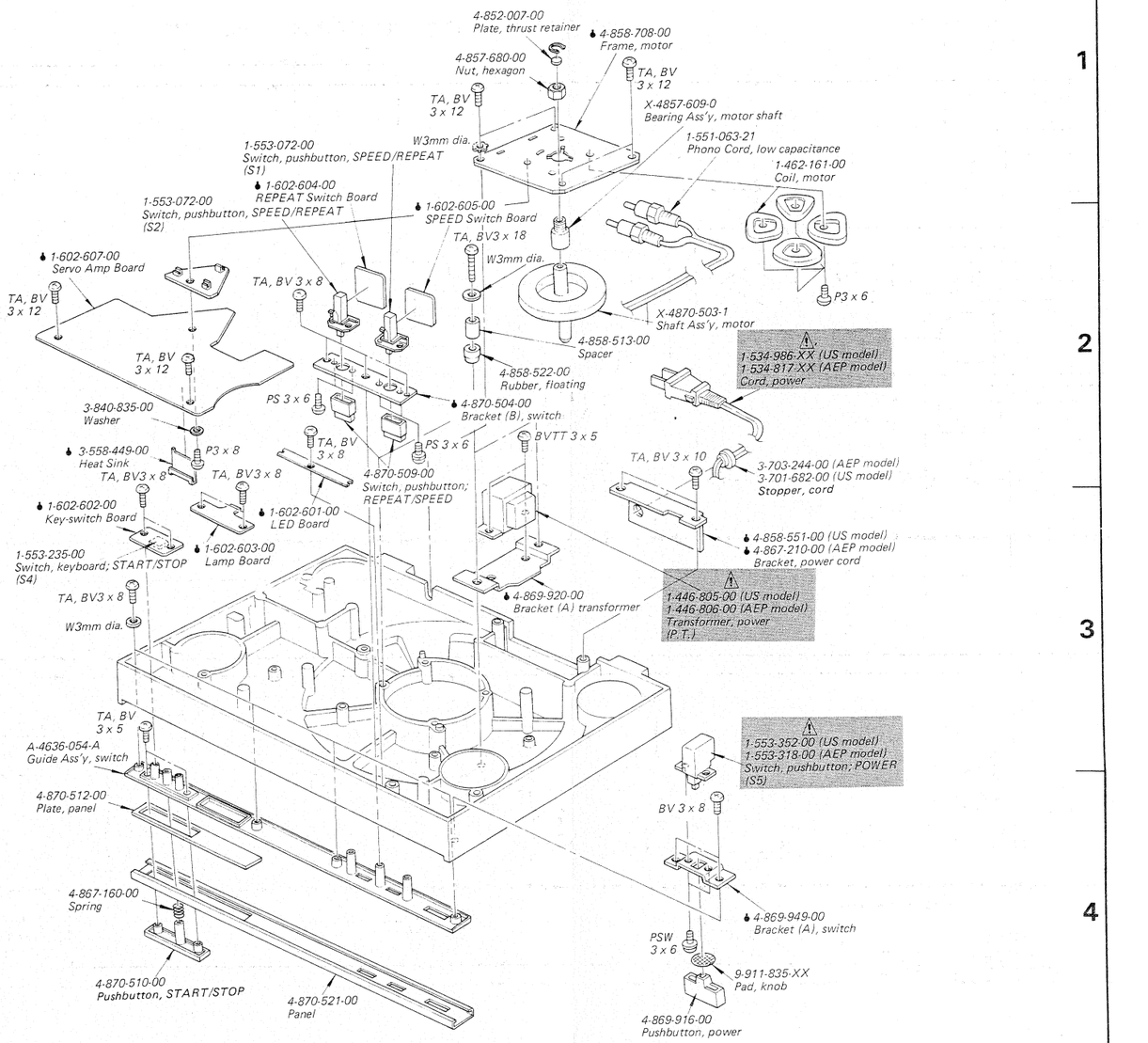


Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

Note:

- Items marked "●" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- All screws are Phillips (cross recess) type unless otherwise noted.
  (-) = slotted head

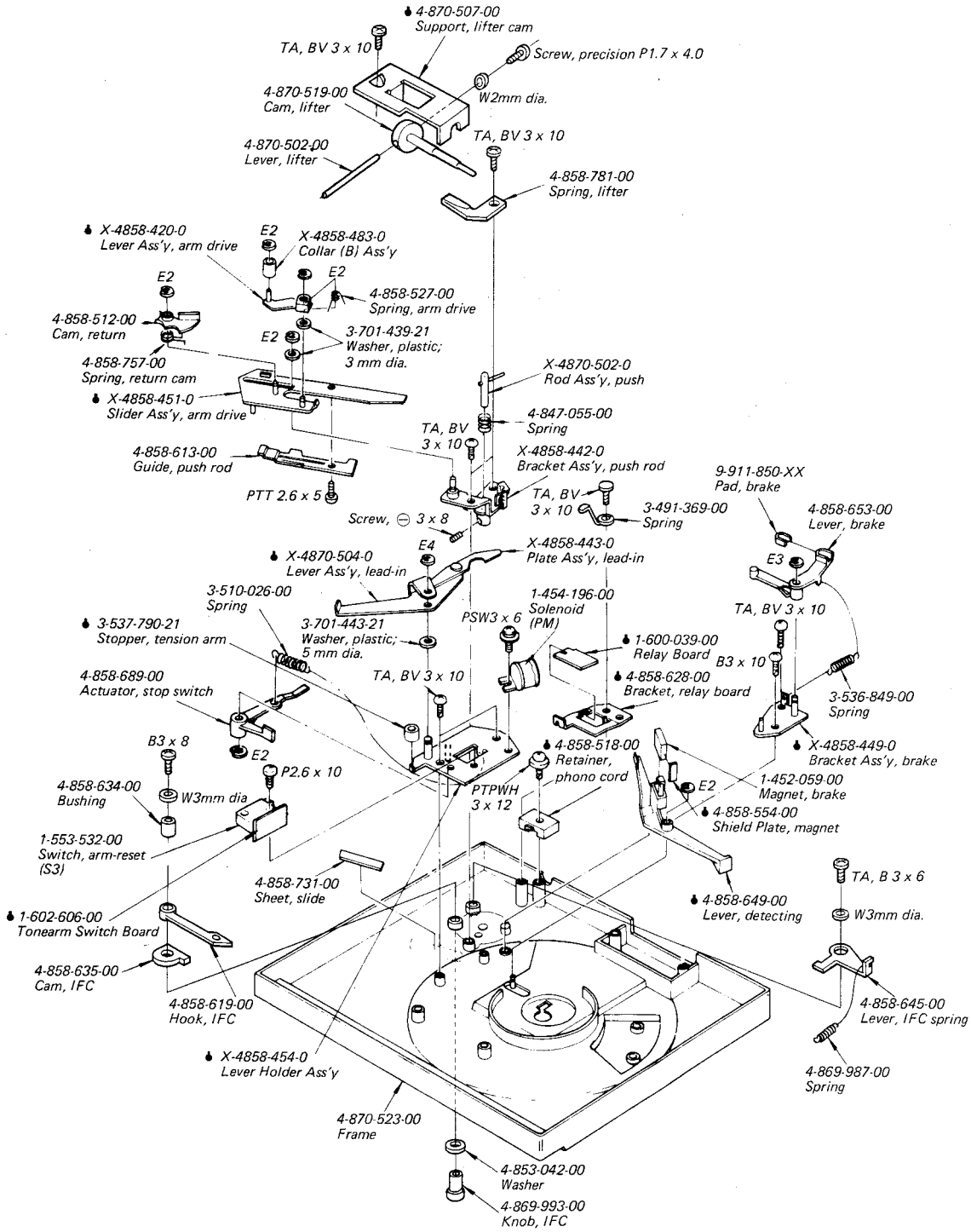
5-2.



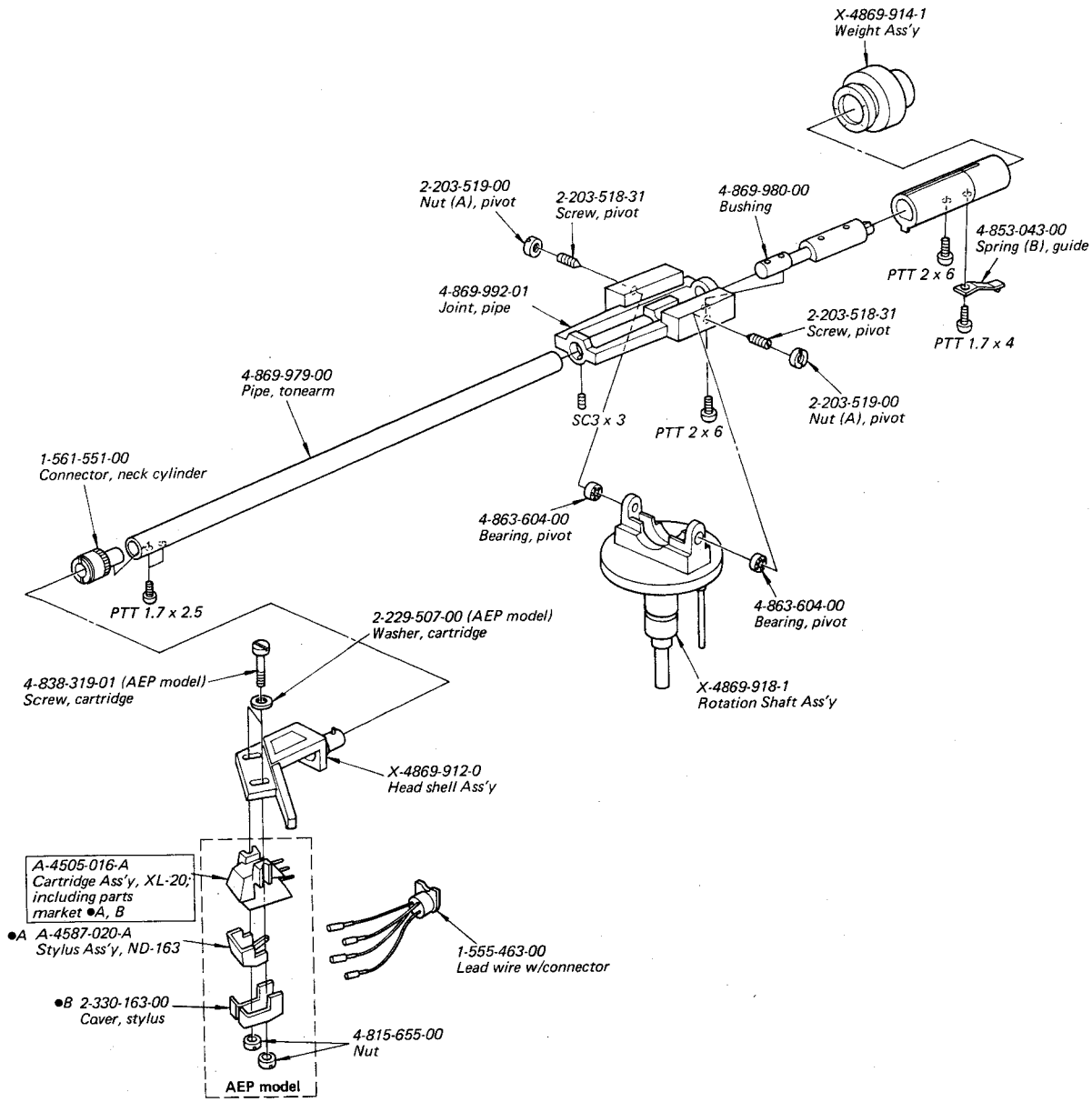
A B C

1 2 3 4 5

5-3.


4-870-507-00
Support, lifter cam
TA, BV 3 x 10
Screw, precision P1.7 x 4.0
W2mm dia.
4-870-519-00
Cam, lifter
TA, BV 3 x 10
4-870-502-00
Lever, lifter
4-858-781-00
Spring, lifter
X-4858-420-0
Lever Ass'y, arm drive
E2
X-4858-483-0
Collar (B) Ass'y
E2
E2
4-858-527-00
Spring, arm drive
4-858-512-00
Cam, return
E2
3-701-439-21
Washer, plastic;
3 mm dia.
4-858-757-00
Spring, return cam
X-4858-451-0
Slider Ass'y, arm drive
X-4870-502-0
Rod Ass'y, push
4-847-055-00
Spring
TA, BV
3 x 10
4-858-613-00
Guide, push rod
X-4858-442-0
Bracket Ass'y, push rod
PTT 2.6 x 5
TA, BV
3 x 10
3-491-369-00
Spring
Screw, ⊖ 3 x 8
9-911-850-XX
Pad, brake
4-858-653-00
Lever, brake
E3
E4
X-4858-504-0
Lever Ass'y, lead-in
X-4858-443-0
Plate Ass'y, lead-in
3-510-026-00
Spring
1-454-196-00
Solenoid
(PM)
PSW3 x 6
TA, BV 3 x 10
3-537-790-21
Stopper, tension arm
3-701-443-21
Washer, plastic;
5 mm dia.
1-600-039-00
Relay Board
B3 x 10
4-858-689-00
Actuator, stop switch
TA, BV 3 x 10
4-858-628-00
Bracket, relay board
3-536-849-00
Spring
B3 x 8
E2
P2.6 x 10
4-858-518-00
Retainer,
phono cord
X-4858-449-0
Bracket Ass'y, brake
4-858-634-00
Bushing
W3mm dia
PTPWH
3 x 12
E2
1-452-059-00
Magnet, brake
4-858-554-00
Shield Plate, magnet
1-553-532-00
Switch, arm-reset
(S3)
4-858-731-00
Sheet, slide
TA, B 3 x 6
W3mm dia.
1-602-606-00
Tonearm Switch Board
4-858-649-00
Lever, detecting
4-858-635-00
Cam, IFC
4-858-619-00
Hook, IFC
4-858-645-00
Lever, IFC spring
X-4858-454-0
Lever Holder Ass'y
4-869-987-00
Spring
4-870-523-00
Frame
4-853-042-00
Washer
4-869-993-00
Knob, IFC

5-4.


X-4869-914-1
Weight Ass'y
2-203-519-00
Nut (A), pivot
2-203-518-31
Screw, pivot
4-869-980-00
Bushing
4-853-043-00
Spring (B), guide
PTT 2 x 6
4-869-992-01
Joint, pipe
2-203-518-31
Screw, pivot
PTT 1.7 x 4
4-869-979-00
Pipe, tonearm
SC3 x 3
PTT 2 x 6
2-203-519-00
Nut (A), pivot
1-561-551-00
Connector, neck cylinder
4-863-604-00
Bearing, pivot
PTT 1.7 x 2.5
2-229-507-00 (AEP model)
Washer, cartridge
4-863-604-00
Bearing, pivot
X-4869-918-1
Rotation Shaft Ass'y
4-838-319-01 (AEP model)
Screw, cartridge
X-4869-912-0
Head shell Ass'y
A-4505-016-A
Cartridge Ass'y, XL-20; including parts market •A, B
•A A-4587-020-A
Stylus Ass'y, ND-163
1-555-463-00
Lead wire w/connector
•B 2-330-163-00
Cover, stylus
4-815-655-00
Nut
AEP model

SECTION 6
ELECTRICAL PARTS LIST

Ref. No.	Part No.	Description
	SEMICONDUCTORS	
	Transistors	
Q101–103	8-729-663-47	2SC1364
⇒Q104	8-760-413-10	2SC1475
⇒Q105	8-729-468-43	2SA684
⇒Q106	8-760-413-10	2SC1475
⇒Q107	8-729-468-43	2SA684
Q108	8-729-141-43	2SD414
⇒Q151	8-729-612-77	2SA1027R
Q152–158	8-729-663-47	2SC1364
	ICs	
IC101	8-751-930-00	CX-193
⇒IC102, 103	8-759-145-58	μPC4558C
	Diodes	
D101–103	8-719-311-20	SEL1120R
⇒D104	8-719-815-55	1S1555
D105	8-719-910-92	HZ9A2-L
D106–109	⚠8-719-200-02	10E2
H1, 2	8-719-903-00	HL-300C
	CAPACITORS	
	All capacitors are in μF. Common capacitors are omitted. Refer to the lists on pages 28 and 29 for their part numbers.	
C106	1-102-491-00	51pF 50V ceramic
C181, 182	⚠1-123-324-00	1,000 16V electrolytic nonpolarized
C186	⚠1-130-233-00	0.33 125V film (US model)
	⚠1-161-744-00	0.01 250V ceramic (AEP model)
	RESISTORS	
	All resistors are in ohms. Common ¼W carbon resistors are omitted. Refer to the list on the last page for their part numbers.	
	⇒: Due to standardization, interchangeable replacements may be substituted for parts specified in the diagrams.	

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

Ref. No.	Part No.	Description
R183	⚠1-246-437-00	33 ¼W carbon (US model)
	⚠1-217-393-00	33 ¼W fusible (AEP model)
	MESCELLANEOUS	
HMG	1-543-123-00	Head, speed detecting
PL	1-518-370-00	Lamp, pilot; 8V, 100mA
PM	1-454-196-00	Solenoid
P.T.	⚠1-446-805-00	Transformer, power (US model)
	⚠1-446-806-00	Transformer, power (AEP model)
S1, 2	1-553-072-00	Switch, pushbutton, SPEED/REPEAT
S3	1-553-532-00	Switch, arm-reset
S4	1-553-235-00	Switch, keyboard; START/STOP
S5	⚠1-553-352-00	Switch, pushbutton; POWER (US model)
	⚠1-553-318-00	Switch, pushbutton; POWER (AEP model)
X	1-527-380-21	Crystal
	A-4505-016-A	Cartridge Ass'y, XL-20 (AEP model)
	1-452-059-00	Magnet, brake
	1-462-161-00	Coil, motor
	1-551-063-21	Phono Cord, low capacitance
	⚠1-534-817-XX	Cord, power (AEP model)
	⚠1-534-986-XX	Cord, power (US model)
	1-555-463-00	Lead wire w/connector
	1-561-551-00	Connector, neck cylinder
	COMPLETE CIRCUIT BOARDS	
	A-4619-155-A	Servo (US model)
	A-4619-156-A	Servo (AEP model)
	PRINTED CIRCUIT BOARDS	
	• 1-600-039-00	Relay
	• 1-602-601-00	LED
	• 1-602-602-00	Key-switch
	• 1-602-603-00	Lamp
	• 1-602-604-00	REPEAT Switch
	• 1-602-605-00	SPEED Switch
	• 1-602-606-00	Tonearm Switch
	• 1-602-607-00	Servo Amp

• Items marked "•" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

ACCESSORIES & PACKING MATERIALS

Part No.	*Description*
X-4869-912-0	Head Shell Ass'y
X-4869-915-0	Screw Ass'y, cartridge
3-701-616-00	Bag, polyethylene
3-701-630-00	Bag, polyethylene
3-701-634-00	Bag, polyethylene
3-701-806-00	Adaptor (E), 45rpm
3-783-206-11	Manual, instruction (AEP model)
3-783-206-21	Manual, instruction (US model)
4-847-314-00	Bag, polyethylene
4-862-043-00	Cushion, arm
4-862-680-00	Bag, protection
4-863-668-00	Stopper, gear
4-869-962-00	DP Adjustor
4-869-974-00	Holder, table
4-869-975-00	Cushion, right
4-869-976-00	Cushion, left
4-869-977-00	Package, accessories
4-869-981-00	Weight, sub
4-870-528-00	Carton, individual
4-870-529-00	Shell Case
4-870-530-00	Shell Label

ELECTROLYTIC CAPACITORS

CAP. (μF)	RATING → : Use the high voltage rated one.					
	6.3 VOLT.	10 VOLT.	16 VOLT.	25 VOLT.	35 VOLT.	50 VOLT.
	PART No.	PART No.	PART No.	PART No.	PART No.	PART No.
0.47					→	1-121-726-00
1.0					→	1-121-391-00
2.2					→	1-121-450-00
3.3	→	→	→	1-121-392-00	→	1-121-393-00
4.7	→	→	→	1-121-395-00	→	1-121-396-00
10	→	→	1-121-651-00	1-121-398-00	→	1-121-738-00
22	→	→	1-121-479-00	1-121-480-00	1-121-662-00	1-121-152-00
33	→	→	1-121-403-00	1-121-404-00	1-121-652-00	1-121-405-00
47	→	1-121-352-00	1-121-409-00	1-121-410-00	1-121-653-00	1-121-411-00
100	→	1-121-414-00	1-121-415-00	1-121-416-00	1-121-357-00	1-121-417-00
220	1-121-419-00	1-121-420-00	1-121-421-00	1-121-422-00	1-121-261-00	1-121-423-00
330	1-121-751-00	1-121-805-00	1-121-521-00	1-121-654-00	1-121-655-00	1-121-656-00
470	1-121-424-00	1-121-425-00	1-121-426-00	1-121-733-00	1-121-361-00	1-121-810-00
1000	–	1-121-736-00	1-121-245-00	1-121-657-00	1-121-388-00	1-123-061-00
2200	1-121-658-00	1-121-659-00	1-121-660-00	1-123-067-00	1-121-984-00	–
3300	1-121-661-00	1-123-075-00	1-123-071-00	–	–	–

CAP. (μF)	100 VOLT.	160 VOLT.	250 VOLT.	350 VOLT.
	PART No.	PART No.	PART No.	PART No.
0.47	–	–	–	–
1.0	1-123-249-00	1-123-252-00	1-123-003-00	1-121-168-00
2.2	1-123-250-00	1-123-026-00	–	1-123-028-00
3.3	1-121-995-00	–	1-123-004-00	1-123-006-00
4.7	1-123-255-00	1-121-246-00	1-121-759-00	1-123-007-00
10	1-121-126-00	1-121-999-00	1-123-254-00	1-123-008-00
22	1-121-996-00	1-123-253-00	1-123-005-00	1-123-022-00
33	1-121-997-00	1-121-757-00	–	–
47	1-123-251-00	1-121-919-00	–	–
100	1-123-084-00	–	–	–

CERAMIC CAPACITORS

CAP. (pF)	RATING 50 VOLT. PART No.	CAP. (pF)	50 VOLT. PART No.	CAP. (pF)	50 VOLT. PART No.	CAP. (μF)	50 VOLT. PART No.
0.5	1-101-837-00	22	1-102-959-00	150	1-101-361-00	0.001	1-102-074-00
0.75	1-101-586-00	24	1-102-960-00	160	1-101-367-00	0.0012	1-102-118-00
1.0	1-102-934-00	27	1-102-961-00	180	1-102-976-00	0.0015	1-102-119-00
1.5	1-101-576-00	30	1-102-962-00	200	1-102-977-00	0.0018	1-102-120-00
2.0	1-102-935-00	33	1-102-963-00	220	1-102-978-00	0.0022	1-102-121-00
3	1-102-936-00	36	1-102-964-00	240	1-102-979-00	0.0027	1-102-122-00
4	1-102-937-00	39	1-102-965-00	270	1-102-980-00	0.0033	1-102-123-00
5	1-102-942-00	43	1-102-966-00	300	1-102-981-00	0.0039	1-102-124-00
6	1-102-943-00	47	1-101-880-00	330	1-102-820-00	0.0047	1-102-125-00
7	1-102-944-00	51	1-101-882-00	360	1-102-821-00	0.0056	1-102-126-00
8	1-102-945-00	56	1-101-884-00	390	1-102-822-00	0.0068	1-102-127-00
9	1-102-946-00	62	1-101-886-00	430	1-102-823-00	0.0082	1-102-128-00
10	1-102-947-00	68	1-101-888-00	470	1-102-824-00	0.01	1-102-129-00
11	1-102-948-00	75	1-101-890-00	510	1-101-059-00	0.022	1-101-005-00
12	1-102-949-00	82	1-102-971-00	560	1-102-115-00	0.047	1-101-006-00
13	1-102-950-00	91	1-102-972-00	680	1-102-116-00		
15	1-102-951-00	100	1-102-973-00	820	1-102-117-00		
16	1-102-952-00	110	1-102-815-00				
18	1-102-953-00	120	1-102-816-00				
20	1-102-958-00	130	1-101-081-00				

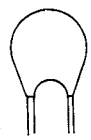
0.001μF = 1,000pF

CERAMIC (SEMICONDUCTOR) CAPACITORS

CAP. (μF)	RATING → : Use the high voltage rated one. 25 VOLT. PART No.	50 VOLT. PART No.	CAP. (μF)	25 VOLT. PART No.	50 VOLT. PART No.
0.001	→	1-161-039-00	0.018	1-161-016-00	1-161-054-00
0.0012	→	1-161-040-00	0.022	1-161-017-00	1-161-055-00
0.0015		1-161-041-00	0.027	1-161-018-00	1-161-056-00
0.0018		1-161-042-00	0.033	1-161-019-00	1-161-057-00
0.0022		1-161-043-00	0.039	1-161-010-00	1-161-058-00
0.0027	→	1-161-044-00	0.047	1-161-021-00	1-161-059-00
0.0033	→	1-161-045-00	0.056	→	1-161-060-00
0.0039	→	1-161-046-00	0.068	→	1-161-061-00
0.0047	→	1-161-047-00	0.082	1-161-024-00	1-161-062-00
0.0056	→	1-161-048-00	0.1	1-161-025-00	1-161-063-00
0.0068	→	1-161-049-00			
0.0082	1-161-012-00	1-161-050-00			
0.01	1-161-013-00	1-161-051-00			
0.012	→	1-161-052-00			
0.015	1-161-015-00	1-161-053-00			

MYLAR CAPACITORS

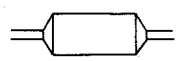
CAP. (μF)	RATING 50 VOLT. PART No.	100 VOLT. PART No.	200 VOLT. PART No.	CAP. (μF)	50 VOLT. PART No.	100 VOLT. PART No.	200 VOLT. PART No.	CAP. (μF)	50 VOLT. PART No.	100 VOLT. PART No.	200 VOLT. PART No.
0.001	1-108-227-00	1-108-365-00	1-108-409-00	0.01	1-108-239-00	1-108-377-00	1-108-421-00	0.1	1-108-251-00	1-108-389-00	1-108-433-00
0.0012	1-108-351-00	1-108-366-00	1-108-410-00	0.012	1-108-357-00	1-108-378-00	1-108-422-00	0.12	1-108-363-00	1-108-390-00	1-108-434-00
0.0015	1-108-228-00	1-108-367-00	1-108-411-00	0.015	1-108-240-00	1-108-379-00	1-108-423-00	0.15	1-108-252-00	1-108-391-00	1-108-435-00
0.0018	1-108-352-00	1-108-368-00	1-108-412-00	0.018	1-108-358-00	1-108-380-00	1-108-424-00	0.18	1-108-364-00	1-108-392-00	1-108-436-00
0.0022	1-108-230-00	1-108-369-00	1-108-413-00	0.022	1-108-242-00	1-108-381-00	1-108-425-00	0.22	1-108-254-00	1-108-393-00	1-108-437-00
0.0027	1-108-353-00	1-108-370-00	1-108-414-00	0.027	1-108-359-00	1-108-382-00	1-108-426-00	0.27	1-108-854-00	–	–
0.0033	1-108-232-00	1-108-371-00	1-108-415-00	0.033	1-108-244-00	1-108-383-00	1-108-427-00	0.33	1-108-855-00	–	–
0.0039	1-108-354-00	1-108-372-00	1-108-416-00	0.039	1-108-360-00	1-108-384-00	1-108-428-00	0.39	1-108-856-00	–	–
0.0047	1-108-234-00	1-108-373-00	1-108-417-00	0.047	1-108-246-00	1-108-385-00	1-108-429-00	0.47	1-108-857-00	–	–
0.0056	1-108-355-00	1-108-374-00	1-108-418-00	0.056	1-108-361-00	1-108-386-00	1-108-430-00				
0.0068	1-108-237-00	1-108-375-00	1-108-419-00	0.068	1-108-249-00	1-108-387-00	1-108-431-00				
0.0082	1-108-356-00	1-108-376-00	1-108-420-00	0.082	1-108-362-00	1-108-388-00	1-108-432-00				



TANTALUM CAPACITORS

→: Use the high voltage rated one.

CAP. (μF)	RATING 3.15 VOLT. PART No.	6.3 VOLT. PART No.	10 VOLT. PART No.	16 VOLT. PART No.	20 VOLT. PART No.	25 VOLT. PART No.	35 VOLT. PART No.
0.01					→	→	1-131-396-00
0.015						→	1-131-397-00
0.022						→	1-131-398-00
0.033						→	1-131-399-00
0.047						→	1-131-400-00
0.068					→	→	1-131-401-00
0.1					→	→	1-131-402-00
0.15					→	→	1-131-403-00
0.22					→	→	1-131-404-00
0.33					→	1-131-409-00	1-131-405-00
0.47	–	–	–	–	1-131-412-00	→	1-131-406-00
0.68	–	–	–	1-131-415-00	→	1-131-410-00	1-131-407-00
1.0	–	–	1-131-418-00	–	1-131-413-00	→	1-131-408-00
1.5	–	1-131-421-00	–	1-131-416-00	→	1-131-411-00	1-131-348-00
2.2	1-131-424-00	–	1-131-419-00	–	1-131-414-00	1-131-355-00	1-131-349-00
3.3	–	1-131-422-00	–	1-131-417-00	1-131-362-00	1-131-356-00	1-131-350-00
4.7	1-131-425-00	–	1-131-420-00	1-131-369-00	1-131-363-00	1-131-357-00	1-131-351-00
6.8	–	1-131-423-00	1-131-376-00	1-131-370-00	1-131-364-00	1-131-358-00	1-131-352-00
10	1-131-426-00	1-131-383-00	1-131-377-00	1-131-371-00	1-131-365-00	1-131-359-00	1-131-353-00
15	1-131-390-00	1-131-384-00	1-131-378-00	1-131-372-00	1-131-366-00	1-131-360-00	–
22	1-131-391-00	1-131-385-00	1-131-379-00	1-131-373-00	1-131-367-00		
33	1-131-392-00	1-131-386-00	1-131-380-00	1-131-374-00			
47	1-131-393-00	1-131-387-00	1-131-381-00	–			
68	1-131-394-00	1-131-388-00	–	–			
100	1-131-395-00	–	–	–			



TANTALUM CAPACITORS

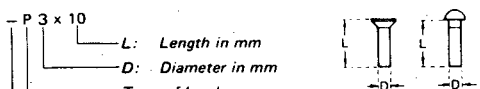
CAP. (μF)	RATING 3 VOLT. PART No.	6.3 VOLT. PART No.	10 VOLT. PART No.	16 VOLT. PART No.	20 VOLT. PART No.	35 VOLT. PART No.
0.033						1-131-273-00
0.047						1-131-274-00
0.068						1-131-275-00
0.1						1-131-276-00
0.15						1-131-277-00
0.22			–	–	1-131-262-00	1-131-278-00
0.33			–	–	1-131-263-00	1-131-279-00
0.47			1-131-169-00	–	1-131-264-00	1-131-280-00
0.68			–	1-131-258-00	1-131-265-00	1-131-281-00
1.0			1-131-254-00	–	1-131-266-00	1-131-282-00
1.5		1-131-250-00	–	–	1-131-267-00	1-131-283-00
2.2		–	–	1-131-259-00	1-131-268-00	1-131-284-00
3.3		–	1-131-255-00	–	1-131-269-00	–
4.7		1-131-251-00	1-131-171-00	–	1-131-270-00	–
6.8		–	–	1-131-260-00	1-131-271-00	–
10	–	–	1-131-256-00	–	1-131-272-00	–
15	–	1-131-252-00	–	1-131-261-00		
22	–	–	1-131-257-00	–		
33	1-131-176-00	1-131-253-00	1-131-173-00	–		
47	1-131-288-00	1-131-174-00	–	–		
100	1-131-177-00					

1/4 WATT CARBON RESISTORS

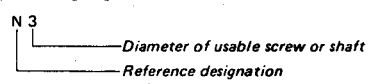
Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.
1.0	1-246-401-00	10	1-246-425-00	100	1-246-449-00	1.0k	1-246-473-00	10k	1-246-497-00	100k	1-246-521-00	1.0M	1-246-545-00
1.1	1-246-402-00	11	1-246-426-00	110	1-246-450-00	1.1k	1-246-474-00	11k	1-246-498-00	110k	1-246-522-00	1.1M	1-210-814-00
1.2	1-246-403-00	12	1-246-427-00	120	1-246-451-00	1.2k	1-246-475-00	12k	1-246-499-00	120k	1-246-523-00	1.2M	1-210-815-00
1.3	1-246-404-00	13	1-246-428-00	130	1-246-452-00	1.3k	1-246-576-00	13k	1-246-500-00	130k	1-246-524-00	1.3M	1-210-816-00
1.5	1-246-405-00	15	1-246-429-00	150	1-246-453-00	1.5k	1-246-577-00	15k	1-246-501-00	150k	1-246-525-00	1.5M	1-210-817-00
1.6	1-246-406-00	16	1-246-430-00	160	1-246-454-00	1.6k	1-246-578-00	16k	1-246-502-00	160k	1-246-526-00	1.6M	1-210-818-00
1.8	1-246-407-00	18	1-246-431-00	180	1-246-455-00	1.8k	1-246-579-00	18k	1-246-503-00	180k	1-246-527-00	1.8M	1-210-819-00
2.0	1-246-408-00	20	1-246-432-00	200	1-246-456-00	2.0k	1-246-580-00	20k	1-246-504-00	200k	1-246-528-00	2.0M	1-210-820-00
2.2	1-246-409-00	22	1-246-433-00	220	1-246-457-00	2.2k	1-246-581-00	22k	1-246-505-00	220k	1-246-529-00	2.2M	1-210-821-00
2.4	1-246-410-00	24	1-246-434-00	240	1-246-458-00	2.4k	1-246-582-00	24k	1-246-506-00	240k	1-246-530-00	2.4M	1-244-754-00
2.7	1-246-411-00	27	1-246-435-00	270	1-246-459-00	2.7k	1-246-583-00	27k	1-246-507-00	270k	1-246-531-00	2.7M	1-244-755-00
3.0	1-246-412-00	30	1-246-436-00	300	1-246-460-00	3.0k	1-246-584-00	30k	1-246-508-00	300k	1-246-532-00	3.0M	1-244-756-00
3.3	1-246-413-00	33	1-246-437-00	330	1-246-461-00	3.3k	1-246-585-00	33k	1-246-509-00	330k	1-246-533-00	3.3M	1-244-757-00
3.6	1-246-414-00	36	1-246-438-00	360	1-246-462-00	3.6k	1-246-586-00	36k	1-246-510-00	360k	1-246-534-00	3.6M	1-244-758-00
3.9	1-246-415-00	39	1-246-439-00	390	1-246-463-00	3.9k	1-246-587-00	39k	1-246-511-00	390k	1-246-535-00	3.9M	1-244-759-00
4.3	1-246-416-00	43	1-246-440-00	430	1-246-464-00	4.3k	1-246-488-00	43k	1-246-512-00	430k	1-246-536-00	4.3M	1-244-760-00
4.7	1-246-417-00	47	1-246-441-00	470	1-246-465-00	4.7k	1-246-489-00	47k	1-246-513-00	470k	1-246-537-00	4.7M	1-244-761-00
5.1	1-246-418-00	51	1-246-442-00	510	1-246-466-00	5.1k	1-246-490-00	51k	1-246-514-00	510k	1-246-538-00	5.1M	1-244-762-00
5.6	1-246-419-00	56	1-246-443-00	560	1-246-467-00	5.6k	1-246-491-00	56k	1-246-515-00	560k	1-246-539-00		
6.2	1-246-420-00	62	1-246-444-00	620	1-246-468-00	6.2k	1-246-492-00	62k	1-246-516-00	620k	1-246-540-00		
6.8	1-246-421-00	68	1-246-445-00	680	1-246-469-00	6.8k	1-246-493-00	68k	1-246-517-00	680k	1-246-541-00		
7.5	1-246-422-00	75	1-246-446-00	750	1-246-470-00	7.5k	1-246-494-00	75k	1-246-518-00	750k	1-246-542-00		
8.2	1-246-423-00	82	1-246-447-00	820	1-246-471-00	8.2k	1-246-495-00	82k	1-246-519-00	820k	1-246-543-00		
9.1	1-246-424-00	91	1-246-448-00	910	1-246-472-00	9.1k	1-246-496-00	91k	1-246-520-00	910k	1-246-544-00		

HARDWARE NOMENCLATURE

Screw:



Nut, Washer, Retaining ring:



Reference Designation	Shape	Description	Remarks
SCREWS			
P		pan-head screw	binding-head (B) screw for replacement
PWH		pan-head screw with washer face	binding-head (B) screw and flat washer for replacement
PS PSP		pan-head screw with spring washer	binding-head (B) screw and spring washer for replacement
PSW PSPW		pan-head screw with spring and flat washers	binding-head (B) screw and spring and flat washers for replacement
R		round-head screw	binding-head (B) screw for replacement
K		flat-countersunk-head screw	
RK		oval-countersunk-head screw	
B		binding-head screw	
T		truss-head screw	binding-head (B) screw for replacement
F		flat-fillister-head screw	
RF		fillister-head screw	
BV		braizer-head screw	

Reference Designation	Shape	Description	Remarks
SELF-TAPPING SCREWS			
TA		self-tapping screw	ex: TA, P 3 x 10
PTP		pan-head self-tapping screw	binding-head self-tapping (TA, B) screw for replacement
PTPWH		pan-head self-tapping screw with washer face	binding-head self tapping (TA, B) screw and flat washer for replacement
PTTWH		pan-head thread-rolling screw with washer face	binding-head (B) screw and flat washer for replacement
SET SCREWS			
SC		set screw	
SC		hexagon-socket set screw	ex: SC 2.6 x 4, hexagon socket
NUT			
N		nut	
WASHERS			
W		flat washer	
SW		spring washer	
LW		internal-tooth lock washer	ex: LW3, internal
LW		external-tooth lock washer	ex: LW3, external
RETAINING RINGS			
E		retaining ring	
G		grip-type retaining ring	

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